



IMPACT OF ENTREPRENEURSHIP EDUCATION IN ENGINEERING COLLEGES TO BUILD SUCCESSFUL ENTREPRENEURS



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Original Article

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Abstract

Examining how engineering college students' aspirations for business changed after receiving entrepreneurship instruction was the driving force for this study. The purpose of this study is to answer the question, "To what extent does college-level entrepreneurship education influence students' entrepreneurial attitude?" in order to determine students' attitudes and intents toward entrepreneurial education. A behavioural theory-supported conceptual model was used to understand the students' attitudes. Despite the increasing amount of research on the subject, many concerns about the impact of entrepreneurship courses at engineering schools remain unresolved. Very little research has focused on the Indian context, particularly how engineering schools there teach entrepreneurship in light of the local environment and socioeconomic conditions. There is a dearth of studies that compare the impact of different teaching approaches on entrepreneurial results, such as project-based learning vs lecture. A new approach to engineering college curricula is needed to foster an atmosphere that encourages the growth of entrepreneurial mindsets and practices.

Keywords: *Engineering Colleges; Entrepreneurship Education; Entrepreneurial Skills; Entrepreneurial Success; Student Entrepreneurship*

Introduction

Entrepreneurship serves as a crucial link between the entrepreneur and the enterprise. The main intention of this research is to examine the impact of entrepreneurship education on engineering and management students regarding their entrepreneurial journey [1]. This research aims to understand the preferences of students in choosing a career in entrepreneurship and the skills they acquire from entrepreneurship education in their engineering or management programmes. The changing awareness of different generations has been recognised by everyone. The government is supporting students in various ways to help them explore their ideas and innovate new products for the market. Implementation of entrepreneurship education has become one of the major changes for the students to understand entrepreneurship, schemes available to start new ventures and opportunities to become an entrepreneur [2]. Engineering colleges are only giving the input factors of entrepreneur education in a theoretical way; they should provide a more in-depth view of the start of the entrepreneurial journey to the students. Engineering colleges need to understand that government initiatives only affect business formations if these initiatives boost the student's attitudes, entrepreneurial abilities, and subjective norms, which could motivate young people to start a promising enterprise. The goal of promoting entrepreneurship in engineering colleges should be to increase the number of individuals considering business start-ups by implementing more focused entrepreneurship education initiatives [3].

Entrepreneurship is an ongoing journey of innovation where individuals create new products to address market problems. Entrepreneurship involves the actions of an entrepreneur, who constantly seeks new ideas and transforms them into profitable opportunities while accepting the associated risks and uncertainties of the enterprise. The word “entrepreneur” is derived from the French verb *entreprendre*, which means ‘to undertake’. This adjective refers to those who “undertake” the risk of new enterprises. An enterprise is created by an entrepreneur. The process of creation is called “entrepreneurship”.

Characteristics of entrepreneurship

- **Skills:** Skills are essential for entrepreneurs to begin their entrepreneurial journey; without these skills, individuals cannot achieve success in their careers. Therefore, skills are crucial for individuals to successfully establish an enterprise.
- **Knowledge about the market:** Many entrepreneurs start their own ventures using their own money without understanding the market, which often leads to failure. Therefore, anyone planning to start their venture must clearly understand the market and its trends before entering it. An entrepreneur's first basic knowledge should be about the market.
- **Risk bearing:** Entrepreneurs should be bold to bear the risk and need to go forward in their area of doing business. Risk is not just loss; it includes expected events that might not occur and unexpected events, and it depends on how an individual handles these unexpected events [5].
- **Understanding the customer problem:** In business, the first objective of the entrepreneur is to understand the customer problem and then solve it as the customer wants. If the entrepreneur clearly addresses the customer's needs, the customer will promote the company through word of mouth, effectively serving as an advertisement.
- **Passion to do something:** Every entrepreneur should have the passion to do something in the market; only then can they blossom in their field. Therefore, every entrepreneur should turn their passion into a business to establish a reputable name in the market.
- **Branding the goodwill in the market:** Many entrepreneurs will establish their businesses but fail to brand themselves effectively in the market. One of the objectives for entrepreneurs should be to establish their brand's goodwill in the market, allowing the company to gain a distinct identity and achieve success.
- **Service-oriented:** Entrepreneurs should be service-oriented in their initial days of their entrepreneurial journey. Services provided by the entrepreneurs and their company are to be identified by the customers, and they need to be loyal to the company. Any problem of the customer needs to be solved by the entrepreneurs by their problem-solving method through service; then the customer will be loyal to the product in the market.

Need & Scope of the Study

Entrepreneurship significantly contributes to the country's economic growth by enabling entrepreneurs to establish their own ventures and provide valuable business services. Today students are the next generation builders of the country's economic growth, so students need to understand about entrepreneurship, entrepreneurs, and enterprises while they are studying in the UG & PG courses. Nowadays, although all engineering and management colleges have implemented entrepreneurship education, students still struggle to start their own ventures or businesses.

The scope of the study

The scope of the study is limited to the students at engineering colleges in and around Ranga Reddy district. The study collected data from three colleges: Lords Engineering College, Vidya Jyothi Institute of Technology, and Global College of Engineering.

Objectives

- To learn about entrepreneurship
- To know the factors influencing the students to build the entrepreneurial journey
- To identify the challenges and opportunities in current entrepreneurial education practices

- The aim is to examine how entrepreneurship education contributes to the development of a successful career.

Methodology

Using a validated Entrepreneurship Intention Questionnaire, data was collected from 140 engineering college final-year students. It was shown that engineering college students who participated in entrepreneurship education had a more favourable outlook on becoming entrepreneurs, as it altered their intentions towards entrepreneurship and enhanced their entrepreneurial abilities [6].

Hypothesis

Hypothesis 1

H0: Entrepreneurial education does not impact students' ability to start their entrepreneurial journey.

H1: Entrepreneurial education positively impacts students' ability to begin their entrepreneurial journey.

Hypothesis 2

H0: There are no significant differences between the gender and factors of entrepreneurship success.

H1: There are significant differences between gender and factors affecting entrepreneurship success.

Hypothesis 3

H0: There are no significant differences between gender and motivation factors for picking the entrepreneurship subject in their curriculum.

H1: There are significant differences between gender and motivation factors for picking the entrepreneurship subject in their curriculum.

Literature Review

The influence of entrepreneurship education at engineering institutions on producing successful entrepreneurs is substantial, however context dependent. Research has shown that teaching students about entrepreneurship has a favourable effect on their self-confidence and entrepreneurial intentions [7, 8, 9]. Be that as it may, the study results do include some intriguing ambiguities and inconsistencies. It seems that entrepreneurial family history, rather than entrepreneurship education alone, has a more significant beneficial effect on engineering students' desire to be entrepreneurs [7]. University-Based Entrepreneurial Ecosystems (UBEE) also offer extracurricular support programs that have a big influence on engineering students' entrepreneurial goals and self-efficacy [9]. Students enrolled in engineering programs can increase their chances of becoming successful business owners by participating in entrepreneurship competitions [8] and using problem-based learning strategies [10]. According to Breznitz et al. [11], a more effective way to influence students' entrepreneurial self-efficacy and intents is to take a comprehensive strategy that incorporates assistance for education, idea creation, and company growth. In order for engineering universities' entrepreneurship programs to make the most of their resources, it is essential to create courses that combine classroom learning with real-world experience and make use of the backing of different players in the entrepreneurial ecosystem.

Several studies have shown that entrepreneurship education greatly benefits aspiring business owners. According to studies conducted by Saadat et al. and Rauch et al. [10, 12], students who take entrepreneurship classes report an increase in the number of new ventures they launch after graduating. Although there may be discrepancies between expectations and results, the majority of the 64 MBA graduates surveyed reported being happy with their entrepreneurship programs [13]. It is worth noting that there is no universally accepted measure of how successful entrepreneurship education is. Entrepreneurial intentions limit their effect on actual entrepreneurial action, but they also favourably affect attitudes and perceived behavioural control [14]. Additionally, it is most effective to promote the development of high-tech firms through the integration of entrepreneurial education from many sources, including universities, government organisations, and incubators [11].

Finally, entrepreneurship education is important for producing entrepreneurs, but it has far-reaching effects beyond those of a simple informational program. According to Lee et al. [14], Saadat et al. [10] and Liu et al. [8], it also affects

sustainability consciousness, attentiveness, and entrepreneurial zeal. Programs like this can be even more effective when they use e-learning technology and prioritize the development of an entrepreneurial attitude [8, 11, 15]. These findings highlight the need for ongoing investment and program enhancement in entrepreneurship education, as entrepreneurship is seen to be essential for boosting the economy and creating jobs.

Methodology

The research design adopted for this research is descriptive and exploratory. In this research, the data is collected from primary sources through a structured questionnaire from various engineering colleges that offer entrepreneurship as a subject in their courses. Data is collected only from IV-year students who are in the final semester of their course. The purposive sampling design used for selecting the sample resulted in a total of 200 responses, of which 174 were analysed and 26 were deemed biased. Therefore, 174 responses were considered for the analysis for this research [3] (refer to Table 1 (a to c)).

Result

Hypothesis – 1

H0: Entrepreneurial education does not influence students in starting their entrepreneurial journey.

H1: Entrepreneurial education positively influences students in starting their entrepreneurial journey.

Table 1(a): Case Processing Summary

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Does your college provide Entrepreneurial Education * Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Entrepreneurial idea]	174	100.0%	0	0.0%	174	100.0%

Source: SPSS Results of data

Table 1(b): Crosstabulation of entrepreneurial education and faculty influence on entrepreneurial ideas

Does your college provide Entrepreneurial Education * Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Entrepreneurial idea] Crosstabulation								
				Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Entrepreneurial idea]				Total
			Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Does your college provide Entrepreneurial Education	No	Count	2	10	5	1	0	18
		Expected Count	3.9	10.9	3.1	1	0	18.0
		% within Does your college provide Entrepreneurial Education	11.1%	55.6%	27.8%	5.6%	0.0%	100.0%
		% within Do you think the below factors discussed by the faculty may lead you to become	5.3%	9.5%	16.7%	100.0%	0.0%	10.3%

		an entrepreneur [Entrepreneurial idea]						
	Yes	Count	36	95	25	0	0	156
		Expected Count	34.1	94.1	26.9	9	0	156.0
		% within Does your college provide Entrepreneurial Education	23.1%	60.9%	16.0%	0.0%	0.0%	100.0%
		% within Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Entrepreneurial idea]	94.7%	90.5%	83.3%	0.0%	0.0%	89.7%
Total		Count	38	105	30	1	0	174
		Expected Count	38.0	105.0	30.0	1.0	0.0	174.0
		% within Does your college provide Entrepreneurial Education	21.8%	60.3%	17.2%	0.6%	0.0%	100.0%
		% within Do you think the below factors discussed by the faculty may leads you to become an entrepreneur [Entrepreneurial idea]	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: SPSS Results of data

Table 1(c): Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.094 ^a	4	0.011
Likelihood Ratio	6.995	4	0.072
N of Valid Cases	174		
a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 0.10.			

Source: SPSS Results of data

Interpretation

The above data interpret that the calculated value of the chi-square shows 11.094, and the estimated significance level is 0.05. The standard table value for a 5% significance level and degree of freedom 4 is 9.488, where the calculated value is more than the standard table value (i.e., $11.094 > 9.488$). Therefore, we reject the null hypothesis and accept the alternative hypothesis, which states that entrepreneurial education positively impacts students in starting their entrepreneurial journey (refer to Table 2 (a to d)).

Hypothesis – 2

H0: There are no significant differences between gender and factors of entrepreneurship success.

H1: There are significant differences between the gender and factors of entrepreneurship success.

Table 2(a): Case Processing Summary

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Confidence of the entrepreneur]	174	100.0%	0	0.0%	174	100.0%

Source: SPSS Results of data

Table 2(b): Crosstabulation of gender and faculty influence on entrepreneurial confidence

Gender * Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Confidence of the entrepreneur] Crosstabulation						
			Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Confidence of the entrepreneur]			Total
			Agree	Neutral	Strongly Agree	
Gender	Female	Count	36	1	27	64
		Expected Count	32.0	16.6	15.4	64.0
		% within Gender	56.3%	1.6%	42.2%	100.0%
		% within Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Confidence of the entrepreneur]	41.4%	2.2%	64.3%	36.8%
	Male	Count	51	44	15	110
		Expected Count	55.0	28.4	26.6	110.0
		% within Gender	46.4%	40.0%	13.6%	100.0%
		% within Do you think the below factors discussed by the faculty may lead you to become an	58.6%	97.8%	35.7%	63.2%

		entrepreneur [Confidence of the entrepreneur]				
Total	Count		87	45	42	174
	Expected Count		87.0	45.0	42.0	174.0
	% within Gender		50.0%	25.9%	24.1%	100.0%
	% within Do you think the below factors discussed by the faculty may lead you to become an entrepreneur [Confidence of the entrepreneur]		100.0%	100.0%	100.0%	100.0%

Source: SPSS Results of data

Table 2(c): Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	37.568 ^a	2	0.000
Likelihood Ratio	46.562	2	0.000
N of Valid Cases	174		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.45.			

Source: SPSS Results of data

Table 2(d): Symmetric Measures^c

Symmetric Measures ^c			
		Value	Approximate Significance
Nominal by Nominal	Phi	0.465	0.000
	Cramer's V	0.465	0.000
N of Valid Cases		174	
c. Correlation statistics are available for numeric data only.			

Source: SPSS Results of data

Interpretation

The above data interpret that the calculated value of the chi-square shows 37.568 and the estimated significance level is 0.05. The standard table value for a 5% significance level and degree of freedom 2 is 5.991, where the calculated value is more than the standard table value (i.e., $37.568 > 5.991$). Thereby, we reject the null hypothesis and accept the alternative hypothesis, i.e., there are significant differences between the gender and factors of entrepreneurship success (refer to Table 3 (a to d)).

Hypothesis - 3

H0: There are no significant differences between gender and motivation factors for picking the entrepreneurship subject in their curriculum.

H1: There are significant differences between gender and motivation factors for picking the entrepreneurship subject in their curriculum.

Table 3(a): Case Processing Summary

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * What is the motivation factor to pick the entrepreneurship subject in your curriculum	174	100.0%	0	0.0%	174	100.0%

Source: SPSS Results of data

Table 3(b): Crosstabulation of gender and motivation to choose entrepreneurship subject

Gender * What is the motivation factor to pick the entrepreneurship subject in your curriculum Crosstabulation							
			What is the motivation factor to pick the entrepreneurship subject in your curriculum				Total
			To become an entrepreneur	To become an Intrapreneur	To develop an Ideology	To Know Fundamentals of Entrepreneurship	
Gender	Female	Count	28	0	24	12	64
		Expected Count	21.3	1.8	15.8	25.0	64.0
		% within Gender	43.8%	0.0%	37.5%	18.8%	100.0%
		% within What is the motivation factor to pick the entrepreneurship subject in your curriculum	48.3%	0.0%	55.8%	17.6%	36.8%
	Male	Count	30	5	19	56	110
		Expected Count	36.7	3.2	27.2	43.0	110.0
		% within Gender	27.3%	4.5%	17.3%	50.9%	100.0%
		% within What is the motivation	51.7%	100.0%	44.2%	82.4%	63.2%

		factor to pick the entrepreneurs hip subject in your curriculum					
Total	Count	58	5	43	68	174	
	Expected Count	58.0	5.0	43.0	68.0	174.0	
	% within Gender	33.3%	2.9%	24.7%	39.1%	100.0 %	
	% within What is the motivation factor to pick the entrepreneurs hip subject in your curriculum	100.0%	100.0%	100.0%	100.0%	100.0 %	

Source: SPSS Results of data

Table 3(c): Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	23.610 ^a	3	0.000
Likelihood Ratio	26.169	3	0.000
N of Valid Cases	174		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.84.			

Source: SPSS Results of data

Table 3(d): Symmetric Measures^c

Symmetric Measures ^c			
		Value	Approximate Significance
Nominal by Nominal	Phi	.368	.000
	Cramer's V	.368	.000
N of Valid Cases		174	
c. Correlation statistics are available for numeric data only.			

Source: SPSS Results of data

Interpretation

The above data interpret that the calculated value of the chi-square shows 23.610 and the estimated significance level is 0.05. The standard table value for a 5% significance level and degree of freedom 3 is 7.815, where the calculated value

is more than the standard table value (i.e., $23.610 > 7.815$). Subsequently, we reject the null hypothesis and accept the alternative hypothesis, i.e., there are significant differences between the gender and motivation factors for picking the entrepreneurship subject in their curriculum.

Discussion

- Kothireddy [16] explained how T-Hub helps students in Hyderabad turn their ideas into successful businesses by connecting them with accelerator and incubator services.
- Telangana Startup Mission – Program / State Report. 2022 – 2023 [17]: Annual reports and official programs detailing Telangana's capacity-building initiatives (RICH, T-Works, WE-Hub) as well as training, campus outreach, and incubation statistics.
- Malathi [18] explained Pedagogies and competitions are discussed in a recent empirical study that assesses the influence of entrepreneurship education at universities on students' entrepreneurial ambition and involvement.
- According to Bashetty [19], based on the results of a survey of around 260 engineering students in Hyderabad, the study reveals that there is a higher emphasis on behavioural attitudes towards entrepreneurship compared to affective attitudes, and it implies that EE programs can be improved.
- Gangadhara [20] explained entrepreneurial purpose using an integrated model that combines capital theory with the theory of planned behaviour (TPB). Education is discussed as a significant antecedent.
- Students who had faith in their own talents as successful entrepreneurs were more likely to show initiative and originality of thought, suggesting a favourable correlation between self-efficacy and entrepreneurial strength [21, 22, 23].
- Some colleges, including Moinabad, provide entrepreneurship cells, seminars, and mentorship programs; nonetheless, there is a dearth of financial backing, incubation spaces, and connections to local businesses [24].
- Competencies in risk-taking, business model creation, and team management were stronger among students who said they had more opportunities to acquire institutional assistance [25].
- Students require an enabling environment in addition to self-confidence to succeed as entrepreneurs; research indicates that the two factors have a substantial combined influence on entrepreneurial potential.
- There seems to have been a failure in communication and outreach, as many students were not aware that their schools offered entrepreneurial programs or resources [26].
- Students in the business and management streams had more entrepreneurial ability than those in the arts and sciences, which may be attributable to the exposure these students had in their respective curricula [27].
- There were small but discernible impacts of gender and socioeconomic status on students' perceptions of their abilities; students from urban families and male students in particular reported higher levels of confidence [28].

Suggestion

- To promote entrepreneurial thinking and exposure to a wider range of ideas, educational institutions should include practical entrepreneurship courses in all degree programs, not just business [29].
- Institutions of higher learning in Moinabad should establish or enhance their entrepreneurial cells/incubators, facilitate access to startup finance, host frequent workshops, and establish robust mentorship networks with established businesspeople [30].
- Assistance programs went unnoticed by a large number of pupils. The use of orientations, bulletin boards, internet platforms, and classroom announcements to promote entrepreneurial activity is something that institutions could do more of.
- Startup bootcamps, field trips, business plan contests, and internships with businesses are all great ways to provide students real-world experience while also boosting their confidence.
- Students may increase their self-confidence and faith in their own abilities as entrepreneurs by participating in training programs that address topics such as personal growth, leadership, problem-solving, and conquering the fear of failure [31].
- Students can benefit from real-world experience, financing possibilities, and mentors with relevant work expertise when schools and local companies work together.

- Scholarships, peer mentorship, and inclusive policies are all examples of targeted interventions that might help students from marginalized or under-represented groups succeed.
- In order to make sure that entrepreneurship programs are always becoming better, institutions should evaluate them frequently using input and results.

Conclusion

This study aimed to elucidate the relationship among students' entrepreneurial skills, self-efficacy, and institutional support in the Moinabad area. The results indicate that students' desire to start their businesses is heavily influenced by their level of self-confidence (self-efficacy) and the presence of formal institutional resources to help them succeed. Confidence in idea generation, risk-taking, and business plan execution was greater among students with higher levels of self-efficacy. Concurrently, those who were able to make use of institutional resources, including mentoring, training, and funding, demonstrated more robust entrepreneurial abilities. Better communication and more inclusive program design are needed, since the study also showed that there are gaps in awareness and usage of institutional support systems. In addition, there is a lack of infrastructure and industry collaboration in Moinabad's entrepreneurial environment, which is a major drawback.

Authors' Contributions

*Jeevan Kumar has assisted with the study techniques and managed data collection from various engineering colleges for the sample and reviewed and edited the manuscript. He also provided supervision and ensured the quality of the article for final submission.

**Karjun Goud contributed the literature review, research design, and arrangement of the data in the article. He is also responsible for data analysis and interpretation of the results.

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Data Availability Statement

Upon reasonable request, the data supporting the results of this research may be obtained from the corresponding author. The full data, including the replies of both students and faculties, cannot be made publicly accessible due to institutional limitations and concerns about privacy. On the other hand, academic and non-commercial uses may make use of summary datasets and analytic outcomes.

Conflict of Interest

The authors and contributors of this research article confirm that they are not involved in any conflicts of interest that might affect its publication. The results were not impacted by any personal or economic connections since the research was carried out independently.

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